Production and Quality of Aggregates for Asphalt

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Overview

- Production Process
- Quality Products
- Keys to OUR Success

Production Process

Mining Process

- Stripping / Overburden Removal

Mining Process

Mining Process

- Material is hauled to primary crusher

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Mining Process

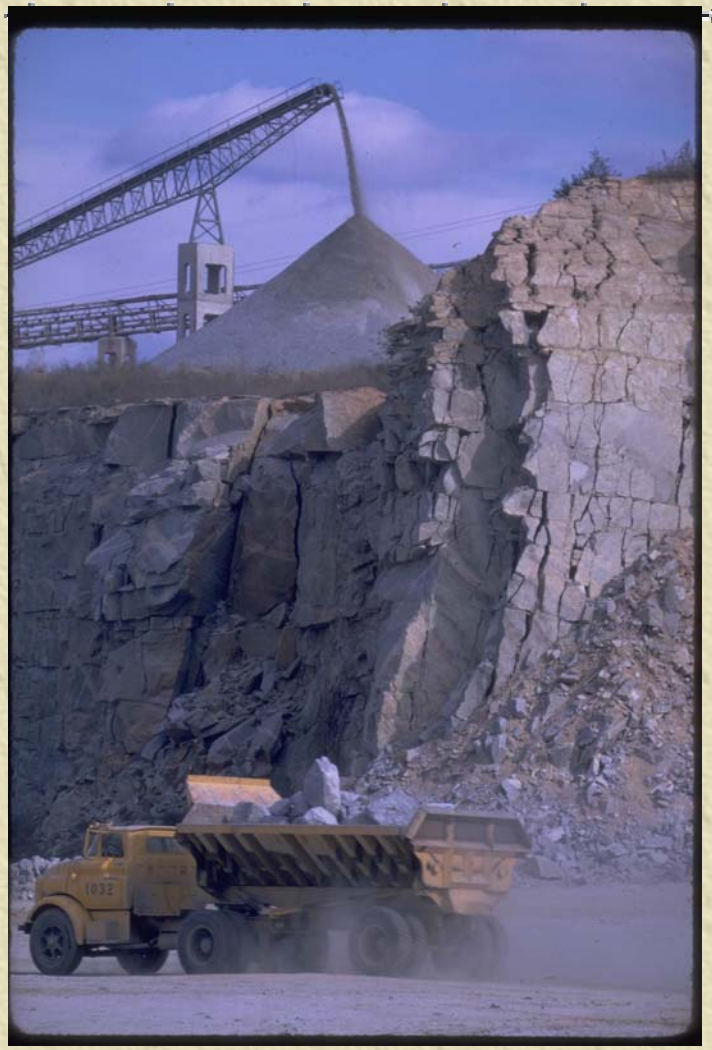
- Gyratory Crusher

Mining Process

- Jaw Crusher

Mining Process

- Material then goes to a surge pile



Mining Process

- Material is screened
- Re-crushed
- Re-screened
- Until proper sized products are made

Mining Process

- Fractionated plants separate material into individual sizes
- Better control of end product gradations

Mining Process

- Final products are washed and placed in bins or stockpiles

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Mining Process

- Products are loaded out and hauled to projects, asphalt plants, concrete plants, or other final destination

Quality Products

QC/QA

- Excellence in “Quality Control” and “Quality Assurance” must have a team effort of everyone associated with the product from the top management through mining, production, handling, storage and shipments.

Quality Control

- The process of controlling the quality of aggregates, encompassing the process plant design, the techniques implemented in the processing, materials handling, stockpiling and load-out
- Control production to produce a quality product

Quality Assurance

- The dependable and accurate monitoring and documentation process to assure that the products shipped do indeed meet aggregate specifications.
- The customer gets what he expects!

Georgia

- Central and North Georgia are blessed with quality deposits
- Each source is unique - mineralogy

Oversize Material

- Continuous mix plants do not have screening capabilities
- Oversize can occur from:
  - Faulty shoot work
  - Worn screens
  - Stockpile contamination
  - Hauler getting wrong material

Gradation Fluctuation

- Some inherit fluctuation

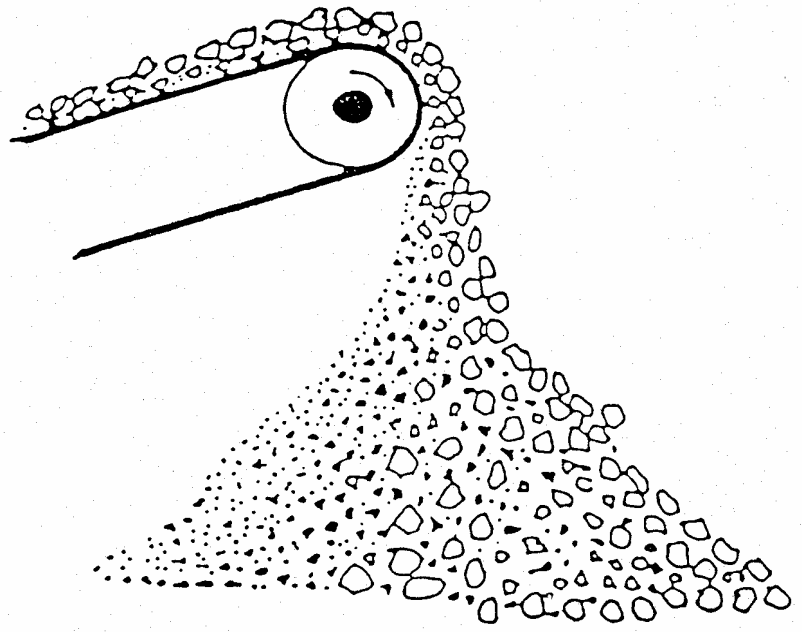
Sand								
Sieve	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	98.5	80.7	61.3	43.3	23.0	7.3	2.1
Std Dev	0.0	0.4	2.1	2.3	2.1	1.7	0.6	0.3
#7 Stone								
Sieve	3/4"	1/2"	3/8"	#4	#8			
% Passing	100	93.4	56.4	7.8	1.4			
Std Dev	0.0	2.0	4.8	1.7	0.3			

Gradation Fluctuation

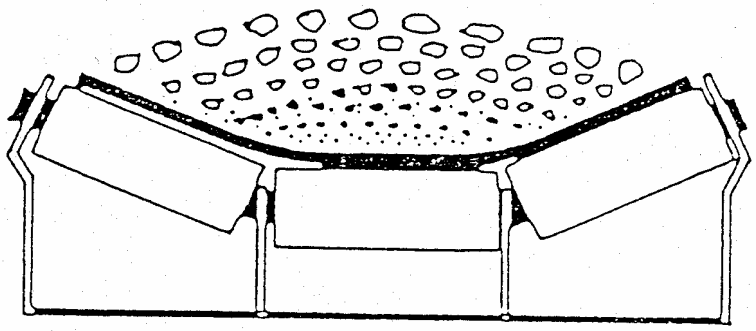
- Variations in feed
- Screens blinding
- Screen wear
- Stockpile/load-out
- Multi-size material (#57)
- Mishandling of material

Segregation

- The separation of particle sizes.
  - Fine ---> Coarse
- Occurs whenever material is moved
  - Blasted, hauled, pushed, conveyed, dumped
- Segregation occurs worst in single cone stockpiles
  - Fractionated plants w/ multiple gates
  - Load-out bins
  - Radial stackers



Aggregate distribution from conveyor



Aggregate segregation on conveyor belt

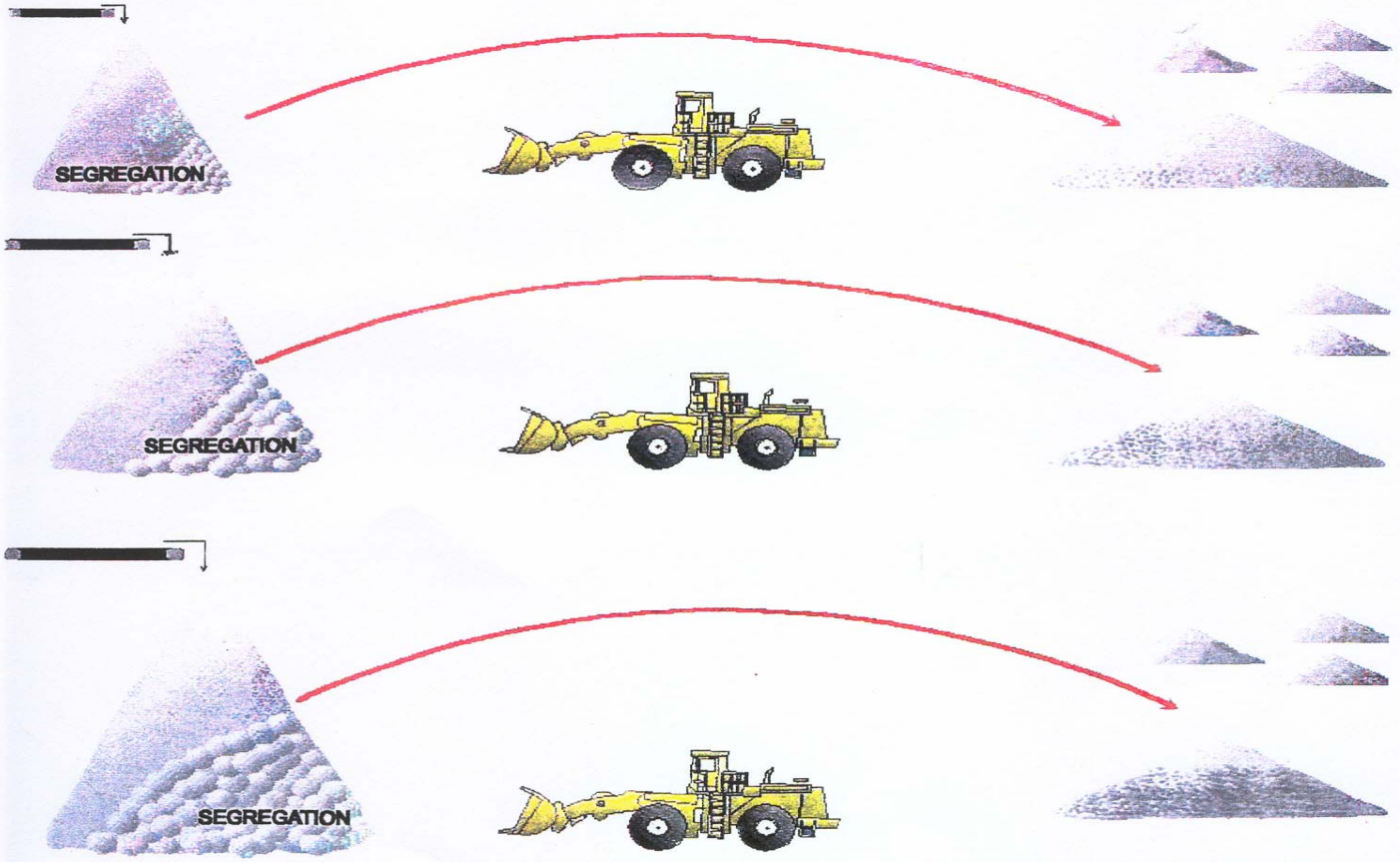
Degradation

- The breakdown of aggregate into smaller fractions.
- Caused by material transfer
  - conveyors
  - load-out bins
  - mixing and placing

RESTOCKING TIP

MOVE THE CONE FREQUENTLY AND CONTINUOUSLY

THE SMALLER THIS IS **THE BETTER THIS IS**

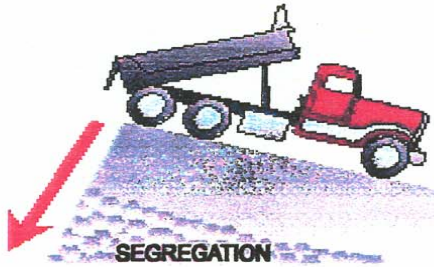


THE CONE CAN BECOME SO SEGREGATED THAT IT SIMPLY CANNOT BE RECLAIMED WITHIN SPECIFICATIONS. THIS IS PARTICULARLY TRUE WITH CLEAN STONE BECAUSE YOU CAN'T RAMP ON THE MATERIAL TO MIX LAYERS. IF YOU STOCKPILE FIVE LOADS THAT FAIL (TOO COARSE), YOU WILL SHIP FIVE LOADS THAT FAIL (TOO COARSE).

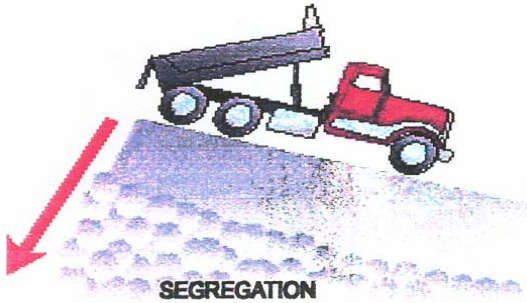
IMPROPER STOCKPILE CONSTRUCTION

IF AN ENTIRE STOCKPILE IS ALLOWED TO BE BUILT BY RAMPING ONTO IT AND DUMPING EACH LOAD OVER THE END…

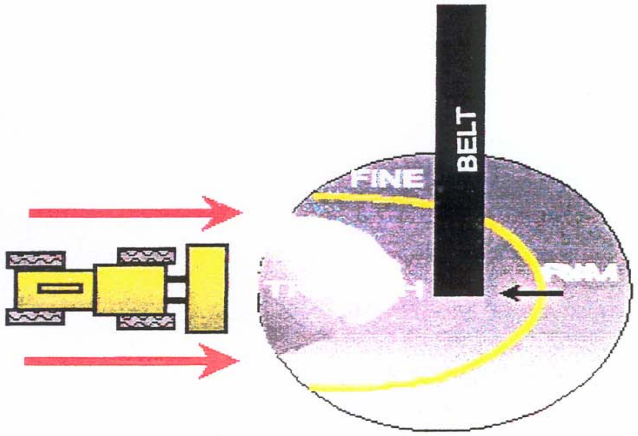
IT WILL SEGREGATE TO ITS FULLEST EXTENT…



THE LARGER THE STOCKPILE BECOMES, THE WORSE THE PROBLEM IS.



TO SHIP FROM PRODUCTION CONE

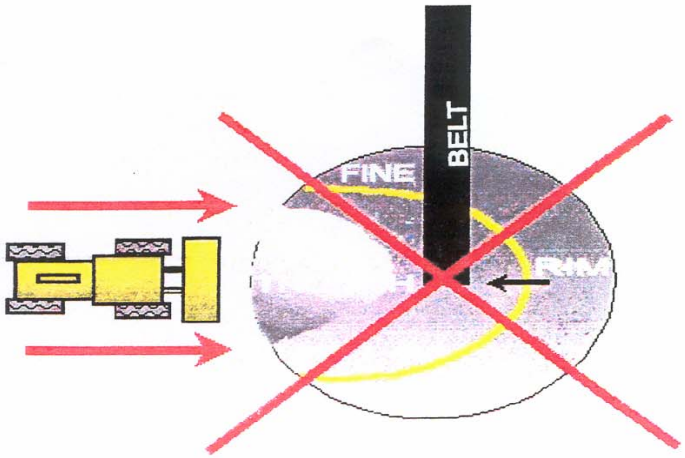


TO SHIP FROM THE PRODUCTION CONE
THE LOADOUT MUST BE EQUAL TO PRODUCTION

REALISTICALLY THIS DOESN'T HAPPEN

THEREFORE

NO SHIPPING
FROM UNDER CONVEYORS



THIS INCLUDES NOT SHIPPING FOR PRIVATE JOBS IF SOME MATERIAL IS BEING RESTOCKED FOR D.O.T. USE.

IMPROPER LOADOUT METHODS

DON'T PULL THE BIN EMPTY

DON'T LOAD FROM UNDER THE BELT

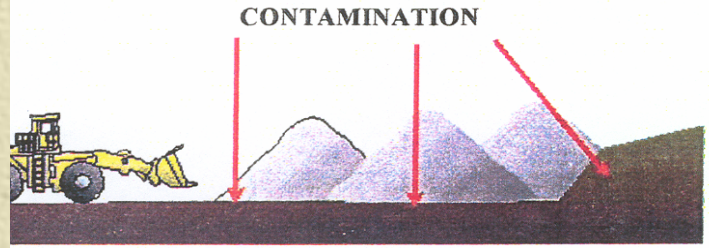
DON'T DUMP OVER THE SIDE OR THE END OF A STOCKPILE

DON'T DUMP PRODUCTION IN FRONT OF THE LOADING FACE

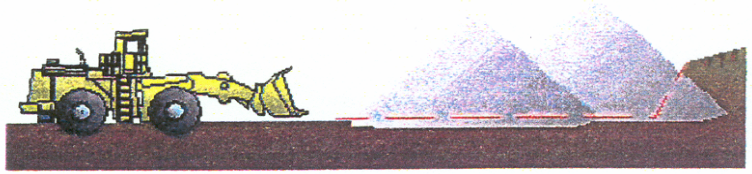
DON'T PUSH OVER THE LOADING FACE DURING ACTIVE USE

STOCKPILING TECHNIQUES FOR CLEAN STONE

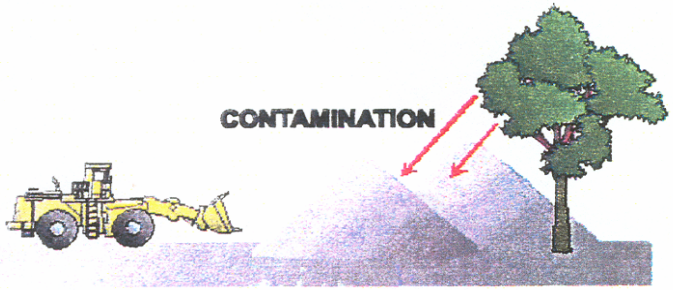
DON'T DIG UP THE MAT



DO KEEP THE BUCKET UP

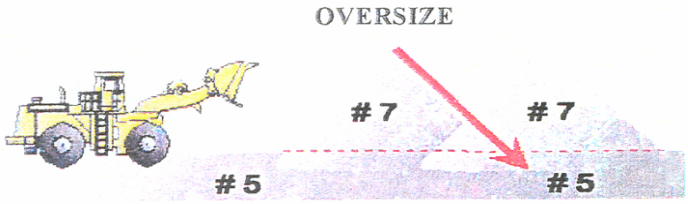


DON'T STOCKPILE NEAR CONTAMINANTS

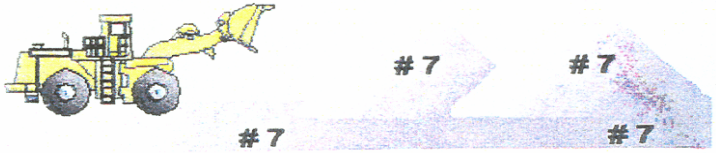


DO REMOVE CONTAMINANTS

DON'T STOCKPILE OVER LARGER SIZES



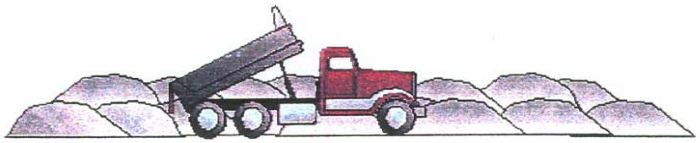
DO STOCKPILE OVER SAME SIZE OR SMALLER



STOCKPILING TECHNIQUES FOR CLEAN STONE

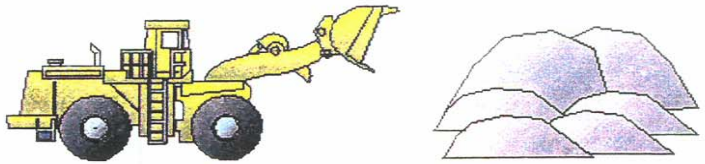
DON'T CONE UP

DO DUMP TIGHTLY IN SINGLE PILES

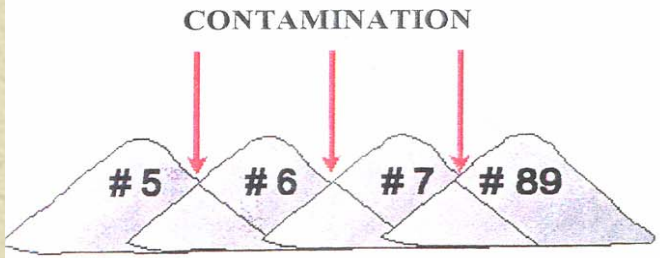


DON'T DUMP OVER THE END

DO STACK AS HIGH AS LOADER WILL REACH



DON'T OVERLAP SIZES

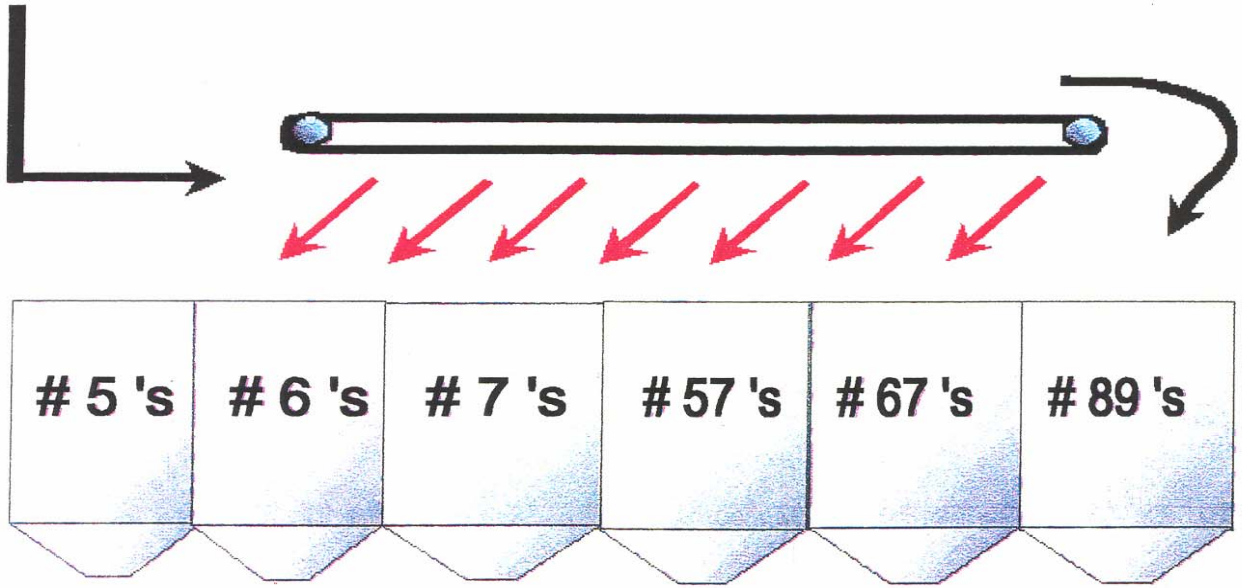


DO SEPARATE DIFFERENT SIZES

BIN CONTAMINATION

THE MOST COMMON CONTAMINATIONS THAT OCCUR IN BINS ARE:

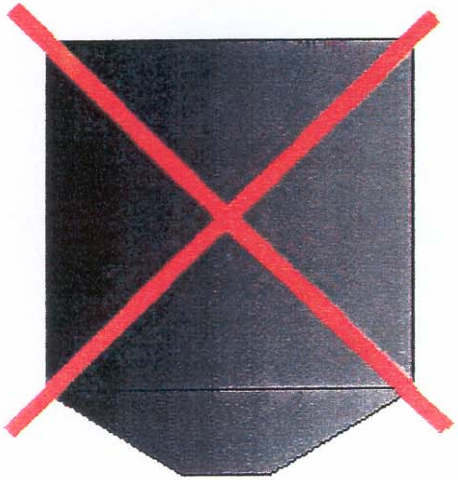
A) OVERSIZE THAT HANGS IN THE BINS
B) OVERSIZE THAT HANGS IN THE CHUTES
C) OVERSIZE THAT BOUNCES FROM SCREENS OR CONVEYORS
D) FINES AND DIRTY WATER THAT STICK TO CONVEYORS AND DRIBBLES OFF ONTO OTHER AGGREGATES



- CONTAMINATION FROM FINES IS TYPICALLY INSIGNIFICANT WHEN MATERIALS ARE STEADILY BEING LOADED OUT.
- CONTAMINATION BECOMES A PROBLEM WHEN A PARTICULAR BIN IS SUBJECTED TO IT FOR TOO LONG – INSPECT DAILY FOR FINES AND OVERSIZE.
- BE SURE TO INFORM THE SUPERVISOR OF WHAT YOU ARE OBSERVING – THERE MAY BE SOMETHING HE/SHE CAN DO TO MINIMIZE THIS TYPE OF CONTAMINATION.
- THERE IS NOTHING UNIQUE ABOUT THIS; IT HAPPENS ALL THE TIME. THE MAIN POINT HERE IS TO LOOK AT IT.
- BIN OPERATORS SHOULD ALSO CHECK TRUCK BEDS FOR CONTAMINATION PRIOR TO LOADING.

BIN SEGREGATION AND DEGRADATION SOLUTION

DON'T EMPTY THE BIN WHILE IN THE PROCESS OF SHIPPING. LEAVING MATERIAL IN THE BIN BREAKS THE FALL. ROCK ON ROCK DOESN'T BREAK AS BAD AS ROCK ON METAL. IT ALSO INTERRUPTS AND DISTORTS THE SEGREGATION CYCLE.



DO LEAVE THE BIN 1 / 4 OR MORE FULL, PREFERABLY 1 / 3

DON'T EMPTY IT!

Moisture

- Necessity for washed products
- Low Inventory
- Weather conditions

Keys to OUR Success

Communication

- Discuss your needs with your suppliers
- Target gradations/consistency
- Moisture data
- Forecast quantities
- Planning for upcoming large projects

Stockpile Management

- Don't drain aggregate bins/stockpiles
  - Easy to do as a tenant
  - Allow for better drainage
  - More consistent products
- Employ good stockpiling practices
  - Don't run equipment on stockpiles
  - Don't dump loads over large stockpiles
  - Build stockpiles loader high
  - Build over smaller size material

QC/QA Program

- Frequent testing
  - Gradation
  - Crusher Data
  - Other physical properties
- Everyone is in QC/QA
  - Examine stockpiles
    - Gradation
    - Oversize
    - Contamination
    - Quantities

Innovations

- Plant designs
  - Fractionation
  - Stockpiling Equipment
  - Load-out systems
- Testing equipment
- Think outside the box!